

09-17-2018

6.6 Logarithmic of Exponential Equations

$$y = \log_a x$$

$$a^y = x$$

$$x^y = a$$

$$x = a^y$$

$$\log_a M = \log_a N, \text{ then } M = N$$

solve: $\log_5 (n+6) + \log_5 (n+2) = 1$

$$\log_5 (n+6)(n+2) = 1$$

~~$$n^2 + 2n + 6n + 12 = 5$$~~

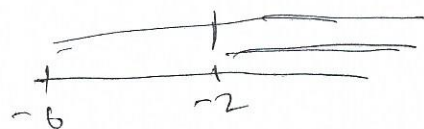
$$n^2 + 8n + 7 = 0$$

$$(n+7)(n+1) = 0$$

$$n = -7, -1$$

$$n+6 > 0 \quad n+2 > 0$$

$$n > -6 \quad n > -2$$



but -1 lies in the overlap.

$$\text{so, } n = -1.$$

$$\ln x = \ln(x+6) - \ln(x-4)$$

$$\ln x = \ln\left(\frac{n+6}{n-4}\right)$$

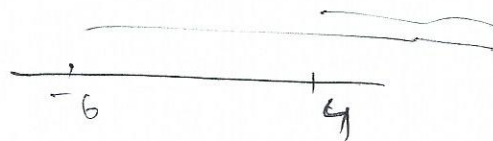
$$n^x - 4n = n+6$$

$$n^x - 5n - 6 = 0$$

~~$$(n-6)(n+1) \quad n^x - 3n - 2n - 6 = 0$$~~

~~$$n = 6, -1 \quad (n-6)(n+1)$$~~

$$n = 6, -1$$



$\{6\}$

$$\log_3 n^{\sqrt{}} = 4$$

$$n^{\sqrt{}} = \cancel{10} 3^4$$

$$n^{\sqrt{}} = \cancel{8} 1$$

$$\cancel{8} n = \cancel{1} 9$$

or

$$2 \log_3 n = 4$$

$$\log_3 n = 2$$

$$n = 3 \checkmark$$

$$2^x = 5$$

$$\rightarrow \ln 2^x = \ln 5$$

$$\log_2 5 = x$$

$$x = \frac{\ln 5}{\ln 2}$$

$$5^{x-2} = 3^{3x+2}$$

$$\ln 5^{x-2} = \ln 3^{3x+2}$$

$$(x-2) \ln 5 = (3x+2) \ln 3$$

$$x \ln 5 - 2 \ln 5 = 3x \ln 3 + 2 \ln 3$$

$$x (\ln 5 - 3 \ln 3) = 2 \ln 3 + 2 \ln 5$$

$$x = \frac{2 \ln 3 + 2 \ln 5}{\ln 5 - 3 \ln 3}$$

$$4^n - 2^n = 12$$

$$ax^2 + bx + c$$

$$2^{2n} - 2^n = 12$$

$$\frac{2^{2n} - 2^n}{2} = 12$$

~~no~~

$$(2^n)^2 - 2^n - 12 = 0$$

$$u^2 - u - 12 = 0$$

$$(u-4)(u+3) = 0$$

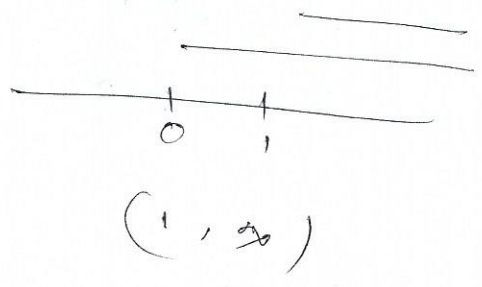
$$(2^n - 4)(2^n + 3) = 0$$

$$2^n = 4$$

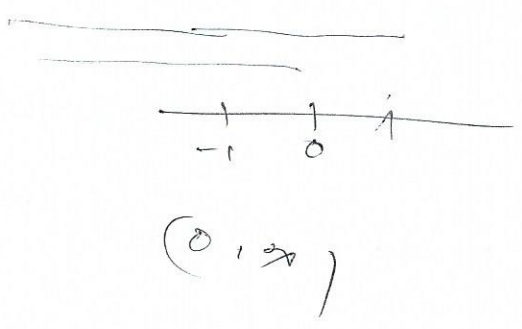
$$2^n = -3$$

Presentation

Case I $\log_3 \frac{n}{n-1}$
 $n > 1$ $n > 1$



Case II
 $n < 0$ $n - 1 < 0$
 $n < 0$ $n < 0$



Presentation⁶

09/21/2018